## **PART II**

## **SECTION 13 STREET LIGHTING SYSTEM**

The City of Miami Beach (CMB) owns and operates the Street Lighting System on City right-of-way. Miami-Dade County operates all traffic signal system and street lights on State and/or County right-of-way. In some instances the CMB owns and operates street, pedestrian and/or up lighting within State and County right-of-way. Consult with Public Works Department prior to designing any system. The following are the minimum requirements to comply with for designing into the City:

## 1.0 GENERAL

#### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install complete and make operational, the electrical system, as shown on the Drawings and as specified herein.
- B. The WORK shall include furnishing and installing the following:
- 1. Electrical Services from the Power Company.
- 2. Conduit, wire and field connections for all lighting control panels, light fixtures and electrical equipment under these specifications.
- 3. Furnish and install precast hand holes and light pole bases.
- 4. Furnish and install hand hole frames and covers.
- 5. It is the intent of these Specifications that the electrical system shall be suitable in every way for the service required. All material and all WORK which may be reasonably implied as being incidental to the WORK of this Section shall be furnished at no extra cost.
- D. Each bidder or their authorized representatives shall, before preparing their proposal, visit all areas of the existing site, buildings and structures in which WORK under this section is to be performed and inspect carefully the present installation. The submission of the proposal by this bidder shall be considered evidence that their representative has visited the site, buildings and structures and noted the locations and conditions under which the WORK will be performed and that he/she takes full responsibility for a complete knowledge of all factors governing his/her WORK.
- E. Field verify all existing underground electrical and mechanical piping.
- F. The CONTRACTOR shall prepare and furnish electrical conduit layout shop drawings for yard electrical, within and under all roads, buildings and structures to the Engineer for approval prior to commencing WORK. Layouts shall include but not be limited to equipment, hand holes, pull boxes, conduit routing, dimensioning, methods and locations of supports, reinforcing, encasement, materials, conduit sizing, equipment access, potential conflicts, building and yard lighting, and all other pertinent technical specifications for all electrical conduits and equipment to be furnished. All layouts shall be drawn to scale on 24" x 36" sheets.
- G. The WORK shall include complete testing of all equipment and wiring at the completion of WORK and making any minor correction changes or adjustments necessary for the proper functioning of the system and equipment. All workmanship shall be of the highest quality; substandard WORK will be rejected.
- H. A single manufacturer shall provide main breaker, panel-boards, mini power zone, lighting control panels, disconnect switches, etc.
- I. CONTRACTOR shall provide their own temporary power for miscellaneous power (drills, pumps, etc.). No facility circuits shall be used unless approved in writing by the Engineer. Any temporary added shall be

removed at job completion.

- J. Complete coordination with other CONTRACTORS. CONTRACTOR shall coordinate with all other CONTRACTORS equipment submittals and obtain all relevant submittals.
- K. Existing street lighting shall remain active at all times through out project, including installation of supplemental light fixtures.
- 1.02 SUBMITTALS
- A. Shop drawings shall be submitted for the following equipment:
  - 1. Raceways, Boxes, Fittings and Hangers
  - 2. Wires and Cables
  - 3. Miscellaneous Equipment
  - 4. Lighting Fixtures and Lamps
  - 5. Precast Hand holes, Frames and Covers
  - 6. Grounding Hardware and Connections
- B. The manufacturers name and product designation or catalog numbers shall be submitted for the following material utilized:
  - 1 Testing Equipment
  - 2. Ground System Resistance Test Equipment
- C. Check shop drawings for accuracy and contract requirements prior to submittal. Shop drawings shall be stamped with the date checked and a statement indicating that the shop drawings conform to the Specifications and the Drawings. This statement shall also list all exceptions to the Specifications and the Drawings not so checked and noted shall be returned.
- D. The Engineer's check shall be for conformance with the design concept of the project and compliance with the Specifications and the Drawings. Errors and omissions on approved shop drawings shall not relieve the CONTRACTOR from the responsibility of providing materials and workmanship required by the Specifications and the Drawings.
- E. All dimensions shall be field verified at the job site and coordinated with the WORK of all other trades.
- F. Material shall not be ordered or shipped until the shop drawings have been approved. No material shall be ordered or shop WORK started if shop drawings are marked "APPROVED AS NOTED CONFIRM", "APPROVED AS NOTED RESUBMIT" or "NOT APPROVED".
- G. In addition to manufacturer's equipment shop drawings, submit electrical installation working drawings containing the following:
  - 1. Concealed and buried conduit layouts, shown on plans drawn at not less than 1/4-in = 1-ft-C-in scale. The layouts shall include locations of transformers, control panels, equipment, motors, switches, motor starters, large junction or pull boxes, hand holes, and any other electrical devices connected to concealed or buried conduits.
  - 2. Plans shall be drawn on paper, size 36-in by 24-in and shall be presented in a neat, professional manner.
  - 3. Concrete floors and/or walls containing concealed conduits shall not be poured until conduit layouts are approved.
- H. Operation and Maintenance Data:
  - 1. Submit operations and maintenance data for equipment furnished under this Section. The

manuals shall be prepared specifically for this installation and shall include catalog data sheets, drawings, equipment lists, descriptions, parts lists, etc, to instruct operating and maintenance personnel unfamiliar with such equipment.

- 2. Manuals shall include the following as a minimum:
  - a. A comprehensive index.
  - b. A complete "As-Built' set of approved shop drawings.
  - c. A complete list of the equipment supplied, including serial numbers, ranges and pertinent data.
  - d. A table listing of the "as left" settings for all timing relays and alarm and trip set points.
  - e. System schematic drawings "As-Built", illustrating all components, piping and electric connections of the systems supplied under this Section.
  - f. Detailed service, maintenance and operation instructions for each item supplied.
  - g. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.
  - h. The operating instructions shall also incorporate a functional description of the entire system, with references to the systems schematic drawings and instructions.
  - i. Complete parts list with stock numbers, including spare parts.

### 1.03 REFERENCE STANDARDS

A. Electric equipment, materials and installation shall comply with the latest edition of National Electrical Code (NEC) and with the latest edition of the following codes and standards:

- 1. National Electrical Safety Code (NESC)
- 2. Occupational Safety and Health Administration (OSHA)
- 3. National Fire Protection Association (NFPA)
- 4. National Electrical Manufacturers Association (NEMA)
- 5. American National Standards Institute (ANSI)
- 6. Insulated Cable Engineers Association (ICEA)
- 7. Instrument Society of America (ISA)
- 8. Underwriters Laboratories (UL)
- 9. Factory Mutual (FM)
- 10. International Electrical Testing Association (NETA)
- 11. Institute of Electrical and Electronic Engineers (IEEE)
- 12. Illuminating Engineering Society of North America (IESNA)
- B. All electrical equipment and materials shall be listed by Underwriter's Laboratories, Inc., and shall bear the appropriate UL listing mark or classification marking. Equipment, materials, etc. utilized not bearing a UL certification shall be field or factory UL certified prior to equipment acceptance and use.
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

### 1.04 PRIORITY OF THE CONTRACT DOCUMENTS

- A. If, during the performance of the WORK, the CONTRACTOR finds a conflict, error or discrepancy between or among one or more of the Sections or between or among one or more Sections and the Drawings, furnishes the higher performance requirements. The higher performance requirement shall be considered the equipment, material, device or installation method which represents the most stringent option, the highest quality or the largest quantity.
- B. In all cases, figured dimensions shall govern over scaled dimensions, but WORK not dimensioned shall be as directed by the Engineer and WORK not particularly shown, identified, sized, or located shall be the same as similar WORK that is shown or specified.

- C. Detailed Drawings shall govern over general drawings, larger scale Drawings take precedence over smaller scale Drawings, Change Order Drawings shall govern over Contract Drawings and Contract Drawings shall govern over Shop Drawings.
- D. If the issue of priority is due to a conflict or discrepancy between the provisions of the Contract Documents and any referenced standard, or code of any technical society, organization or association, the provisions of the Contract Documents will take precedence if they are more stringent or presumptively cause a higher level of performance. If there is any conflict or discrepancy between standard specifications, or codes of any technical society, organization or association, or between Laws and Regulations, the higher performance requirement shall be binding on the CONTRACTOR, unless otherwise directed by the Engineer.

E. In accordance with the intent of the Contract Documents, the CONTRACTOR accepts the fact that compliance with the priority order specified shall not justify an increase in Contract Price or an extension in Contract Time nor limit in any way, the CONTRACTOR'S responsibility to comply with all Laws and Regulations at all times.

### 1.05 ENCLOSURE TYPES

A. Unless otherwise specified herein or shown on the Drawings, electrical enclosures shall have the following ratings:

- 1. NEMA 1 for dry, non-process indoor locations.
- 2. NEMA 12 for "DUST" locations.
- 3. NEMA 4X for outdoor locations, rooms below grade (including basements and buried vaults), "DAMP" and "WET" locations.
- 4. NEMA 4X for "CORROSIVE" locations.
- 5. NEMA 7 (and listed for use in the area classifications shown) for "Class I Division 1 Group D", "Class I Division 2 Group D" and "Class II Division 1" hazardous locations shown on the Drawings.
- 6. NEMA 3R shall be used for indoor installations.

## 1.06 HAZARDOUS AREAS

- A. Equipment, materials and installation in areas designated as hazardous on the Drawings shall comply with NEC Articles 500, 501, 502 and 503.
- B. Equipment and materials installed in hazardous areas shall be UL listed for the appropriate hazardous area classification.

### 1.07 CODES, INSPECTION AND FEES

- A. Equipment, materials and installation shall comply with the requirements of the local authority having jurisdiction.
- B. Obtain all necessary permits and pay all fees required for permits and inspections.

## 1.08 TESTS AND SETTINGS

A. Field testing and commissioning shall be performed in accordance with the latest revisions of NETA Standard ATS "Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems" unless otherwise modified by these Sections.

B. A typed test report for each component tested shall be submitted to the Engineer for the project record files. Test report forms shall be in compliance with NETA standards. A minimum of three complete copies

shall be provided. Reports shall be signed by the person in responsible charge of the field testing, and an officer of the Electrical

- C. Make adjustments to the systems and instruct the Owners personnel in the proper operation of the systems.
- D. In addition to the specific testing requirements listed in the individual sections, the following minimum tests and settings shall be performed.
  - 1. Mechanical inspection, testing and settings of circuit breakers, control circuits and equipment for proper operation.
  - 2. Check power and control power fuse ratings. Replace fuses if they are found to be of the incorrect size.
  - 3. Check interlocking, control and instrument wiring for each system and/or part of a system to prove that the system will function properly as indicated by control schematic and wiring diagrams.
  - 4. Inspect each piece of equipment in areas designated as HAZARDOUS to ensure that equipment of proper rating is installed.
  - 5. Check all wire and cable terminations. Verify to the Engineer connections meet the equipments torque requirements.
- E. Make the following minimum tests and checks prior to energizing electrical equipment. Submit test reports upon completion.
  - 1. Test and calibrate protective relays and circuit breakers.
  - 2. Mechanical inspection of air interrupter switches and circuit breakers to assure proper operation.
- G. Testing shall be scheduled and coordinated in writing with the Engineer at least 2 weeks in advance. The testing firm shall provide all material, labor, equipment and technical supervision to perform the tests and inspection. Provide certified calibration sheets including dates for all equipment to be used for testing with notice of scheduled testing. Calibration sheets shall also indicate that the units have been calibrated within six months of the testing date. The CONTRACTOR shall have qualified personnel present during the testing.

### 1.09 INTERPRETATION OF DRAWINGS

- A. The Drawings are not intended to show exact locations of conduit runs. Coordinate the conduit installation with other trades and the actual supplied equipment.
- B. Install each 3 phase circuit in a separate conduit unless otherwise shown on the Drawings.
- C. Unless otherwise approved by the Engineer, conduit shown exposed shall be installed exposed; conduit shown concealed shall be installed concealed.
- D. Where circuits are shown as "home-runs" all necessary fittings and boxes shall be provided for a complete raceway installation.
- E. Verify the exact locations and mounting heights of lighting fixtures, switches and receptacles prior to installation. Any adjustments required in the field shall be provided at no additional cost to the Owner and coordinated and approved by the Engineer.
- F. Except where dimensions are shown, the locations of equipment, fixtures, outlets and similar devices shown on the Drawings are approximate only. Exact locations shall be determined by the CONTRACTOR

and approved by the Engineer during construction. Obtain information relevant to the placing of electrical WORK and in case of any interference with other WORK, proceed as directed by the Engineer and furnish all labor and materials necessary to complete the WORK in an approved manner.

- G. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials necessary to install and place in satisfactory operation all power, lighting and other electrical systems shown. Additional circuits shall be installed wherever needed to conform to the specific requirements of the approved equipment at no additional cost to the Owner.
- H. Redesign of electrical or mechanical WORK, which is required due to the CONTRACTOR'S use of an alternate item, arrangement of equipment and/or layout other than specified herein, shall be done by the CONTRACTOR at his/her own expense. Redesign and detailed plans shall be submitted to the Engineer for approval. No additional compensation will be provided for changes in the WORK, either his/her own or others, caused by such redesign.

Surface mounted panel boxes, junction boxes, conduit, etc., shall be supported by 1.72 inch spacers to provide a clearance between wall and equipment.

- I. All floor mounted electrical equipment shall be placed on 4-inch thick (3/4-inch, 45 degree chamfer at all exposed edges) concrete pads, provide reinforcement, anchors, etc.
- J. The CONTRACTOR shall harmonize the WORK of the different trades so that interferences between conduits, piping, equipment, architectural and structural WORK will be avoided. All necessary offsets shall be furnished so as to take up a minimum space and all such offsets, fittings, etc, required to accomplish this shall be furnished and installed by the CONTRACTOR without additional expense to the Owner. In case interference develops, the Engineer is to decide which equipment, piping, etc., must be relocated, regardless of which was installed first.
- K. Raceways and conductors for lighting, switches, receptacles and other miscellaneous low voltage power and signal systems as specified are not shown on the Drawings. Raceways and conductors shall be provided as required for a complete and operating system. Homeruns, as shown on the Drawings, are to assist the CONTRACTOR in identifying raceways to be run exposed and raceways to be run concealed. Raceways shall be installed concealed in all finished spaces. Raceways installed exposed shall be near the ceiling or along walls of the areas through which they pass and shall be routed to avoid conflicts with equipment hatches, doors, windows, etc. Raceways installed concealed shall be run in the center of concrete floor slabs, above suspended ceilings, or in partitions as required.

## 1.10 PHASE BALANCING

A. The Drawings do not attempt to balance the electrical loads across the phases. Circuits on panel boards shall be field connected to result in evenly balanced loads across all phases.

### 1.11 SIZE OF EQUIPMENT

A. Investigate each space in the structure through which equipment must pass to reach its final location. Coordinate shipping splits with the manufacturer to permit safe handling and passage through restricted areas in the structure.

B. The equipment shall be kept upright at all times during storage and handling. When equipment must be tilted for passage through restricted areas, brace the equipment to ensure that the tilting does not impair the functional integrity of the equipment.

## 1.12 RECORD DRAWINGS

A. As the WORK progresses, legibly record all field changes on a set of Project Contract Drawings, hereinafter called the Record Drawings'.

B. Record Drawings shall accurately show the installed condition of the following items:

- 1. Power Riser Diagram(s).
- 2. Equipment elevations (front views).
- 3. Raceways and pull boxes.
- 4. Conductor sizes and conduit fills.
- 5. Control Wiring Diagram(s).
- 6. Lighting fixture, receptacle and switch outlet locations.
- 7. Underground raceway, hand hole and duct bank routing.
- 6. Plan view, sizes and locations of distribution transformers and outdoor electrical equipment enclosure.
- C. Submit the record drawings to the Engineer.

## 1.13 EQUIPMENT INTERCONNECTIONS

A. Review shop drawings of equipment furnished under other Divisions and prepare coordinated wiring interconnection diagrams or wiring tables. Submit copies of wiring diagrams or tables with the Record Drawings.

B. Furnish and install all equipment interconnections.

#### 1.14 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be new, except where specifically identified on the Drawings to be reused.
- B. Material and equipment of the same type shall be the product of one manufacturer and shall be UL listed.
- C. Warrant all equipment furnished.

### 1.15 EQUIPMENT IDENTIFICATION

A. Identify equipment (lighting control panels, etc) furnished under Section 13 with the name of the equipment it serves. Control panels, junction or terminal boxes, etc, shall have nameplate designations as shown on the Drawings.

- B. Nameplates shall be engraved, laminated plastic, not less than 1/16-in thick by 3/4-in by 2-1/2-in with 3/16-in high white letters on a black background.
- C. Nameplates shall be screw mounted to NEMA 1 enclosures. Nameplates shall be bonded to all other enclosure types using an epoxy or similar permanent waterproof adhesive. Two sided foam adhesive tape is not acceptable. Where the equipment size does not have space for mounting a nameplate, the nameplate shall be permanently fastened to the adjacent mounting surface. Cemented nameplates shall not be drilled.
- D. All voltages (e.g. 480 volts, 240 volts, etc.) within pull boxes, junction boxes etc. shall be identified on the front exterior cover. Signs shall be red background with white engraved lettering; lettering shall be a minimum of 1" high

### 1.17 SAFETY REQUIREMENTS

A. The CONTRACTOR shall make every effort to keep all employees and/or subcontractors aware of the danger inherent in working in dangerous proximity to the existing power lines. The minimum recommended precautionary measures are as follows:

1. Make sure that all persons responsible for operating cranes, draglines and other mobile equipment have a copy of, and are familiar with the State Department of Commerce Regulations for Use of Cranes, Draglines and Similar Equipment Near Power Lines, as well as the U.S.

Department of Labor OSHA Regulations, before commencing operation of said equipment.

- 2. Make sure that all cranes, draglines and other mobile equipment have attached to them the black and yellow Department of Commerce warning signs required by the said Regulations of State Department of Commerce.
- 3. Warn all employees on the ground, new and old employees alike, of the danger of holding on to or touching a cable or other piece of equipment or machinery that is located or working close to any overhead power line.
- 4. If, during the course of construction, it becomes necessary for the CONTRACTOR, or subcontractor, and their employees, to operate cranes, draglines, or their mobile equipment, in dangerous proximity of any overhead power lines, or in such a manner that such equipment might come close to any overhead power lines, the CONTRACTOR shall give the Power Company or overhead power line owner prior notice of such proposed operation.

### 2.0 MATERIALS

#### A. Service Points:

- 1) Minimum Size 60 AMPS. Pedestrian Lights and Street Lights 480 volts, 3 wire single phase; up lights 240 volts 3 wire single phase.
- 2) Stub pole and pedestal style only see standard details Section 15
- 3) Contractor to coordinate with Florida Power & Light (FPL) for service location and schedules
- 4) To have disconnect, contract and photo cell at a minimum.
- 5) Must have separate circuits for Pedestrian Lights, Street Lights and up lights. Also separate circuit(s) for receptacles.
- 6) All below grade conduit 2" PVC
- 7) All above grade conduit 2" RIGID
- 8) Service points on FPL poles not allowed

### B. Conduit

- 1) Shall be scheduled 40 2" PVC electrical grade
- 2) Shall be solvent welded at <u>all</u> joints
- 3) Shall be at a 24" depth
- 4) Shall be backfilled to 2" above pipe with <u>clean sand</u> rest of way with 1/10 mix (flowable fill) when trenching for new system <u>without</u> new road construction.
- 5) In new road construction, may trench a backfill with compacted limerock in concert with roadway base construction
- Shall be located, where practical: along Lip-of-gutter, 6" 12" out; along median curb, 1' 2' out
- 7) Caution / locating strip to be placed above all conduit runs.

## C. Pull Boxes

- 1) To be Quazite 13"X24" or 17"X30" as applicable see standard details.
- 2) Shall be installed at each lighting fixture location
- 3) Shall have 4" concrete collar 1' min all sides
- 4) Shall be installed on both sides of any road crossing
- 5) Shall have an appropriate sized PVC splice box within see standard details
- 6) Shall have ground rod inside box
- 7) Shall have 1' pea rock base plus interior filled with pea rock to base of splice box see standard details

# D. Street Lights

- 1) Shall be 23' aluminum
- 2) To be set on pre-cast concrete base cast-in-place not allowed
- 3) Shall have a pole base
- 4) Base to have tamper-proof access panel
- 5) Shall be 480 volt 3-wire single phase

- 6) Luminaries shall be G.E. brand 250 watt high pressure sodium
- 7) Base shall have inline fuses on both hot 4 neutral legs.
- 8) Each luminaire shall have its own photocell

### 3.0 EXECUTION

### 3.01 SLEEVES AND FORMS FOR OPENINGS

- A. Provide and place all sleeves for conduits penetrating floors, walls, partitions, etc. Locate all necessary slots for electrical WORK and form before concrete is poured.
- B. Exact locations are required for stubbing-up and terminating concealed conduit. Obtain shop drawings and templates from equipment vendors or other subcontractors and locate the concealed conduit before the floor slab is poured.
- C. Where setting drawings are not available in time to avoid delay in scheduled floor slab pours, the Engineer may allow the installations of such conduit to be exposed. Requests for this deviation must be submitted in writing. No additional compensation for such change will be allowed.

### 3.02 INSTALLATION

- A. Any WORK not installed according to the Drawings and this Division or without approval by the Engineer shall be subject to change as directed by the Engineer. No extra compensation will be allowed for making these changes.
- B. Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by water. Electrical equipment shall not be stored out-of-doors. Electrical equipment shall be stored in dry permanent shelters. If an apparatus has been damaged, such damage shall be repaired at no additional cost. If any apparatus has been subject to possible injury by water, it shall be replaced at no additional cost to the Owner, the damaged unit(s) or systems shall remain on site and returned to the manufacturer after the replacement unit(s) or systems have been delivered to the site. Under no circumstances will electrical equipment damaged by water be rehabilitated or repaired; new equipment shall be supplied and all cost associated with replacement shall be borne by the CONTRACTOR.
- C. Equipment that has been damaged shall be replaced or repaired by the equipment manufacturer, at the Engineer's discretion.
- D. Repaint any damage to factory applied paint finish using touch-up paint furnished by the equipment manufacturer. The entire damaged panel or section shall be repainted per the field painting requirements, at no additional cost to the Owner.